

terms as barrister, though he never practised. It was during this period of privation that he contracted disease of the lungs, from which he suffered greatly up to the time of his premature death. The first thing that brought him to the notice of the scientific world was his experiments on the instinctive movements of birds, which were first described at the Brighton meeting of the British Association in 1872, and published in *Macmillan's Magazine* for February, 1873. From a series of interesting experiments on chickens he showed that the only theory in explanation of the phenomena of instinct that has an air of science about it is the doctrine of inherited association. Instinct, he maintained, in the present generation of animals, is the product of the accumulated experiences of past generations. In another paper at the Bristol meeting of 1875 he communicated the results of further experiments, some described in *NATURE*, vol. viii. p. 289, bearing out still more strongly the conclusions he had already reached, and which he summed up in the statement that "animals and men are conscious automata." The Brighton paper brought Mr. Spalding into deserved repute. While travelling in France he became acquainted with John Stuart Mill, and through him afterwards with many other distinguished men, who all treated Spalding with great respect. Through Mill also, we believe, he became acquainted with Lord and Lady Amberley, with whom he lived as companion and tutor to their children from 1873 until the death of Lord Amberley. Mr. Spalding was appointed guardian to the children, but was ultimately compelled to withdraw from this office owing to his religious opinions, Earl Russell, however, allowing him to retain for life the salary settled upon him by Lord Amberley. For the last two years Mr. Spalding has lived mostly in the south of France, bearing his fatal and protracting illness with the greatest equanimity, regretting only his powerlessness to work and his enforced absence from London.

As to the value of his scientific work our readers having the material before them are able to judge. By his experiments on animals he did much not only to clear up the nature of what is called instinct, but also to shed a new light on certain mental phenomena in man himself. His papers in *NATURE*, mostly reviews of works connected with psychology, on the metaphysics of instinct and evolution—of the latter doctrine he was a warm advocate—were good specimens of clear and close reasoning. That he had a tender side to his character is evident from even his Association papers, and still more so from the interesting letters written by him to *NATURE*, last April, on the swallows and cuckoos at Menton. All who knew him felt that had his health permitted he would have added largely to scientific knowledge in the special department to which he had devoted himself—physiological psychology.

OUR ASTRONOMICAL COLUMN

THE SOLAR ECLIPSE OF 1878, FEBRUARY 2.—The eclipse of the sun in February next will be annular, but the central line passes at such high southern latitudes that the annular phase is not likely to be observed unless it be in the western parts of Tasmania near sun-set. Thus the central eclipse will commence in longitude $103^{\circ} 0'$ west of Greenwich, latitude $73^{\circ} 8'$ south, and will end in longitude $149^{\circ} 25'$ east, latitude $40^{\circ} 58'$, and the eclipse is central at noon in longitude $112^{\circ} 27'$ west, and latitude $84^{\circ} 3'$ south. Another point upon the central line is in longitude $145^{\circ} 25'$ east, and latitude $42^{\circ} 25'$, where the sun's altitude, however, will be less than 4° ; this point lies on the west coast of Tasmania. Launceston is near the central line, but at the middle of the eclipse the sun at that place is almost in the horizon.

A large partial eclipse will be visible over the southern parts of Australia. At Melbourne it will commence at 6h. 1m. P.M. local mean time, at 120° from the sun's north

point towards the west, and will attain its greatest magnitude 0.91 , just before sunset, or at 7h. 4. At Adelaide the eclipse will begin at 5h. 44m. local time and will be greatest about 6h. 45m., when the magnitude will be 0.85 , with the sun at an altitude of between 5° and 6° . At Perth, in Western Australia, the whole eclipse will be visible; greatest about 5h. 25m. local time, magnitude 0.66 , with the sun at an elevation of 23° .

The next total eclipse of the sun visible in those parts of the earth will take place on the morning of September 9, 1885. At Wellington, New Zealand, the eclipse begins about a quarter of an hour after sunrise; totality commences at 7h. 42m. A.M., but continues only about forty seconds; in $175^{\circ} 3'$ east, and $40^{\circ} 34'$ south, on the central line, the duration of totality is 1m. 54s. It should be stated that these figures are founded upon the tables of Damoiseau and Carlini.

THE MINOR PLANET EUPHROSINE.—It does not frequently happen that we have to look for a planet at 60° of north declination; such, however, will be the case at the end of the present year, and in the first days of 1878 as regards Euphrosyne, No. 31 of the group, which was discovered by Ferguson at Washington, on September 1, 1854. The planet will be in opposition on December 18, with the brightness of a star of the tenth magnitude. The following are its calculated positions when passing its greatest northern declination.

12h. Berlin M.T.	Right Ascension. h. m. s.	Declination.	Distance from the Earth.
1877, December 31 ...	5 20 17.1 ...	$60^{\circ} 2' 56''$...	1.613
1878, January 1 ...	5 18 49.5 ...	$60^{\circ} 2' 59''$...	1.614
" " 2 ...	5 17 24.1 ...	$60^{\circ} 2' 38''$...	1.618

The star L. 10067 in Camelopardus, which Lalande calls an eighth, and Argelander a seventh, will be a good guide for identifying the planet in this position. At midnight at Greenwich on January 1, by calculation, Euphrosyne will precede the star seven seconds in R.A., seven minutes to the south of it.

The latest elements of this body which, it will be seen, approaches much nearer to the pole of the equator than the generality of the small planets, are as follows, according to the computations of Mr. S. W. Hill:—

Epoch 1877, December 18 o M.T. at Berlin.

Mean Longitude ...	...	...	$90^{\circ} 10' 23''$
Longitude of Perihelion ...	...	...	$93^{\circ} 17' 30''$
" Ascending Node ...	...	...	$31^{\circ} 33' 23''$
Inclination ...	...	...	$26^{\circ} 28' 34''$
Eccentricity ...	...	...	0.222786
Semi-axis major ...	...	...	3.14902

COMETS OF SHORT PERIOD IN 1878.—Of the comets known to be performing their revolutions in periods of less than ten years, two are due in perihelion again in the ensuing year, probably within a few days of each other. According to Dr. von Asten's elements of Encke's comet at its appearance in 1875, the next perihelion passage, neglecting perturbation, would fall about July 27^o, which involves an apparent track in the heavens unfavourable for observation. In 1845, when the conditions were more nearly the same than at any of the comet's returns since its periodicity was first ascertained, only four observations were secured between July 4 and 14—at Rome, Philadelphia, and Washington. If the comet is not observed before the perihelion in 1878, while at a considerable distance from the earth, it may be found at the observatories of the southern hemisphere, after perihelion, or in the latter part of August, when it makes its nearest approach to us, although its distance at that time will not be less than the mean distance of the earth from the sun. The second comet, which is due in perihelion in 1878, is that discovered by Dr. Tempel on July 1, 1873. The period of revolution assigned by Mr. W. E. Plummer from observations extending to October 20, is 1,850 days; and the comet, neglecting perturbations

which are not likely to be material, would be in perihelion again about July 20; this date, however, will be uncertain, as thus far no definite discussion of the observations in 1873 has been published. Some time since it was stated that Herr Schulhof, of the Vienna Observatory, was at work upon this comet. With the above date for perihelion passage, the apparent path would be favourable for observations, and the comet would approach the earth almost as closely as is possible with the actual form of orbit.

NOTES

THE session of the Royal Society opens next Thursday with the Bakerian Lecture On the Organisation of the Fossil Plants of the Coal Measures, Part ix., which will be delivered by Prof. W. C. Williamson, of Manchester, F.R.S.

WE learn from the *Times* that the following is the list of the new Council which will be submitted to the Royal Society for election at their anniversary meeting on St. Andrew's Day next, the 30th instant:—President, Sir Joseph Dalton Hooker, C.B., K.C.S.I., M.D., D.C.L., LL.D.; Treasurer, William Spottiswoode, M.A., LL.D.; Secretaries, Prof. George Gabriel Stokes, M.A. D.C.L., LL.D., Prof. Thomas Henry Huxley, LL.D.; Foreign Secretary, Prof. Alexander William Williamson, Ph.D.; other members of the Council—Frederick A. Abel, C.B., V.P.C.S., William Bowman, F.R.C.S., Frederick J. Bramwell, M.I.C.E., William B. Carpenter, C.B., M.D., LL.D., William Carruthers, F.L.S., William Crookes, V.P.C.S., Prof. P. Martin Duncan, M.B., P.G.S., William Farr, M.D., D.C.L., Prof. William H. Flower, F.R.C.S., Prof. G. Carey Foster, B.A., F.C.S., John Russell Hind, F.R.A.S., Lord Rayleigh, M.A., Vice-Admiral Sir G. H. Richards, C.B., Prof. Henry J. Stephen Smith, M.A., Prof. Balfour Stewart, M.A., and Prof. Allen Thomson, M.D., F.R.S.E.

MR. F. M. BALFOUR, Fellow and Lecturer of Trinity College, Cambridge, has joined the editorial staff of the *Quarterly Journal of Microscopic Science*. The journal will in future be conducted by Prof. Ray Lankester as responsible editor, with the co-operation of Mr. Archer in Dublin, Mr. Balfour in Cambridge, and Dr. Klein in London. The volume for the year just concluded shows an increase in the number and efficiency of the lithographic plates. Instead of sixteen octavo plates as usual four years ago, there are twenty-five, many of which are double sized, and some coloured.

MADAME LEVERRIER, the widow of the astronomer, died on November 1, at the age of fifty-eight years. This lady was suffering from a protracted illness, when the loss of her husband produced a shock from which she was not able to recover. She was a daughter of M. Choquet, an eminent professor of mathematics in Paris. Her father, about eighty years old, was present at the funeral. On the very day that Madame Leverrier died, the *Journal Officiel* published a decree, signed by M. Brunet, the Minister of Public Instruction, ordering the bust of Leverrier to be placed in the Palace at Versailles, where are to be collected the memorials of the great Frenchmen of the nineteenth century. This honour has been decreed to a number of other men who have ranked foremost amongst *littérateurs*, artists, or politicians. M. Leverrier, it is strange to say, has been chosen as the only representative of science.

THE French Academy of Medicine has been authorised by the ministry to accept a legacy of 4,000*l.* bequeathed by Dr. Demarquay, to help them to build a hall of meeting.

M. FAYE, Inspector-General in Science of Secondary Education in France, has been appointed to a similar office for superior education in succession to the late M. Leverrier. M. Fernet has succeeded to M. Faye's post.

M. WATTEVILLE, director of Arts and Sciences in the French Ministry of Public Instruction, has issued a circular notifying that a special exhibition will be held at the Champ de Mars, for collecting the results of the scientific missions granted by the French Government in 1867. Almost every country, civilised and barbarian, near or remote, has been visited.

M. BERTRAND, the perpetual secretary of the French Academy of Sciences, has been appointed by M. Bonnet member of the International Metric Commission.

COMMANDER GUISEPPE TELFENER has announced his intention of placing at the disposal of the Italian Geographical Society a sum of 40,000 francs to found a section of commercial geography and organise at Rome a museum to contain specimens of all the products which Italy exports and imports.

AT a meeting held at the London Library on October 26 (Mr. Robert Harrison in the chair), it was determined to form an Index Society, with the immediate object of compiling subject indexes and indexes of standard books of facts, to be printed and circulated among the members; and with the ultimate object of building up a general index of universal literature, which can be referred to at the office of the society during compilation. The great aim of the society will be the gradual accumulation of aids towards the preparation of a key to all knowledge, and with this object a library of indexes will be commenced. The subscription will be one guinea. Subscribers' names and suggestions on the subject of the proposed society will be received by Henry B. Wheatley, hon. sec. *pro tem.*, 5, Minford Gardens, West Kensington Park, W. The utility of such a society and such an index to scientific men of all classes and grades will be obvious, and the effort now being made deserves their hearty support.

THE system under which the official addresses are made at the annual meeting of the American Association for the Advancement of Science seems curiously complicated, and sometimes is a puzzle even to the old members of that body. The retiring president, who has been the presiding officer in the preceding year, makes the opening address, which is the presidential address for that year. The presidents of the sections, on the other hand, who have just entered on their duties, open their sections respectively with an address. There are only two sections, A and B; other divisions are parts of these, and are characterised as sub-sections. Section A has charge of mathematics, astronomy, physics, chemistry, and microscopy; Section B of zoology, botany, geology, palæontology, ethnology, and archæology. There is a further complication in the circumstance that the presidents of the sections are also the two vice-presidents of the Association. To illustrate this arrangement, we may cite proceedings at the meeting of last August at Nashville. Prof. W. B. Rogers, who was the president of the Association last year, and president at the Buffalo meeting, was expected to open the Nashville meeting with the presidential address, but was prevented by illness. Professors E. C. Pickering and O. C. Marsh are respectively presidents for the present year of Sections A and B, and also vice-presidents of the Association. The address on "The Introduction and Succession of Vertebrate Life in America," by Prof. Marsh, which we recently published in full, was his official address as the president of Section B, delivered at the opening of the Section. To carry the illustration further, it may be added that Prof. Marsh, who was elected at this year's meeting, president of the Association, will not preside till next year at St. Louis, and will not be expected to deliver his presidential address until the meeting of the following year, 1879.

THE death is announced of Dr. Henry Lawson, until recently editor of the *Popular Science Review*.

MR. JAMES FLOWER, for many years the articulator of the skeletons at the Royal College of Surgeons, has just died from